



NATIONAL Science Bee

The National Science Bee – Varsity/Junior Varsity Division 2019-2020 National Qualifying Exam – A Set Version

NAME: _____ GRADE: _____ (e.g. 8th, 9th, 10th, etc.)

SCHOOL / HOMESCHOOL AFFILIATION: _____

* = Students in 6th- 8th grades are eligible to compete in both JV and Middle School Divisions. Students in 5th grade and younger are eligible to compete in both the JV and Elementary School Divisions. If you are in 8th grade or younger and you qualify for JV Nationals off this Exam, then you are also eligible to compete at Middle School or Elementary School Nationals (depending on your grade) without needing to take another Exam.

Email to report score to: _____ (print neatly!)

Instructions: Print the Correct Answer in the space provided or leave it blank. Write Neatly!!! Correct answers are worth 2 points. Incorrect answers are -1 point. Questions left blank are worth 0 points.

You have 20 minutes to complete this Exam. If you are also taking any other exam(s), you have 40 minutes in which to complete them, and you may do them simultaneously or one after the other.

- _____ 1) In mitosis, which stage comes immediately before anaphase?
A) metaphase B) telophase C) prophase D) meiosis
- _____ 2) Which of the following terms is not used in circle geometry?
A) diameter B) hypotenuse C) radius D) chord
- _____ 3) Which characteristic of a light wave must increase as the light wave passes from glass into air?
A) amplitude B) period C) frequency D) wavelength
- _____ 4) What term is best described as a fluid's resistance to flow?
A) viscosity B) wavelength C) solidity D) diffraction
- _____ 5) Which of these elements is named after the scientist who discovered x-rays?
A) Rutherfordium B) Lawrencium C) Roentgenium D) Seaborgium
- _____ 6) The first spacecraft to explore the dwarf planet Pluto was which probe that passed within 8000 miles of it in 2015?
A) Pioneer X B) Voyager II C) New Horizons D) Gemini
- _____ 7) Which of the following is a unit of electrical resistance?
A) hertz B) coulomb C) ohm D) joule
- _____ 8) In the Linnean classification system, which division is located in between Class and Family?
A) Phylum B) Genus C) Order D) Subphylum

- _____ 9) The longest bone in the human body is which one, found in the leg?
A) patella B) femur C) ulna D) tibia
- _____ 10) A set of points where the sum of the distances to two foci is constant is known as which of the following?
A) ellipse B) circle C) sphere D) parabola
- _____ 11) Proxima Centauri, the star closest to the Earth outside the solar system, is approximately how many light years from Earth?
A) .042 B) .42 C) 4.2 D) 4200
- _____ 12) Which energy transformation occurs in an operating electric motor?
A) electrical to mechanical B) mechanical to electrical
C) chemical to electrical D) electrical to chemical
- _____ 13) In the "C" programming language, which of these data types would require the most bits to represent?
A) int B) short C) char D) double
- _____ 14) How many faces does a tetrahedron have?
A) 4 B) 6 C) 16 D) 30
- _____ 15) The largest asteroid in the asteroid belt is which body, also considered a dwarf planet?
A) Charon B) Nyx C) Ceres D) Oberon
- _____ 16) Which element is least likely to undergo a chemical reaction?
A) lithium B) carbon C) fluorine D) neon
- _____ 17) Which object has the greatest inertia?
A) a falling leaf B) a softball in flight C) a seated student D) a rising helium balloon
- _____ 18) Which particle has a mass of approximately 1 atomic mass unit?
A) alpha particle B) beta particle C) electron D) neutron
- _____ 19) The volume of a sphere can be found using what formula?
A) $\frac{4}{3}\pi r^2$ B) $\pi r^2 h$ C) $\pi r^2 h^3$ D) $(lwh)/3$
- _____ 20) A "tree" is a kind of graph which could best be described as:
A) directed and acyclic B) directed and cyclic C) undirected and acyclic D) undirected and cyclic
- _____ 21) The spreading out of a wave after passing through an opening in a barrier is known as
A) reflection B) convection C) diffusion D) diffraction
- _____ 22) The northernmost species of penguin inhabits which archipelago?
A) Tierra del Fuego B) South Sandwich Islands C) Galapagos Islands D) Seychelles
- _____ 23) Slate is a metamorphic rock that forms from which other type of rock, a sedimentary one whose deposits have recently been tapped for oil exploration?
A) sandstone B) granite C) scoria D) shale

- _____ 24) Which scientist wrote *A Brief History of Time* and names a form of radiation emitted by black holes?
 A) Carl Sagan B) Jonas Salk C) Neil deGrasse Tyson D) Stephen Hawking
- _____ 25) Which metal is most easily oxidized?
 A) silver B) cobalt C) copper D) magnesium
- _____ 26) Which German philosopher is said to have invented calculus, independently of Newton?
 A) Immanuel Kant B) Georg Hegel C) Gottfried Leibniz D) Martin Heidegger
- _____ 27) A triangular array of binomial coefficients is named after what mathematician?
 A) Pythagoras B) Zeno C) Fibonacci D) Pascal
- _____ 28) Which element is malleable at standard temperature and pressure?
 A) chlorine B) helium C) copper D) sulfur
- _____ 29) Which of these organisms is a fruit fly, often studied in biology classes?
 A) E. Coli B) Canis Lupus C) Drosophila Melanogaster D) C. Elegans
- _____ 30) What form of notation is used to describe the complexity of computer algorithms?
 A) Big O B) Feynman slash C) Lambda D) Turing
- _____ 31) If in a triangle, $\angle A = 30^\circ$ and $AB = BC$, which of the following is true of triangle ABC?
 A) it is isosceles B) it is acute C) it is equilateral D) it is a right triangle
- _____ 32) Which of these diseases is more commonly found in African-Americans than in American of European descent?
 A) Small pox B) Sickle Cell Anemia C) Cystic Fibrosis D) Tay-Sachs Disease
- _____ 33) A location at which of these latitudes is most likely to be struck by a hurricane?
 A) 0 degrees B) 30 degrees N C) 60 degrees N D) 90 degrees N
- _____ 34) Which forces can be either attractive or repulsive?
 A) centripetal forces B) magnetic forces C) gravitational forces D) solar wind
- _____ 35) Which of these is not considered one of the 4 great inventions of China?
 A) gunpowder B) paper C) compass D) astrolabe
- _____ 36) Which branch of logic uses "True" and "False" values as a substitute for numbers in mathematical equations?
 A) Binary Geometry B) Hopper Calculus C) Babbage Logic D) Boolean Algebra
- _____ 37) Which of these halogens has the highest electronegativity of any element?
 A) Bromine B) Fluorine C) Chlorine D) Astatine
- _____ 38) Which noble gas makes up the third highest portion of the Earth's dry atmosphere after Nitrogen and Oxygen?
 A) Xenon B) Krypton C) Radon D) Argon
- _____ 39) In the field of astrobiology, the circumstellar habitable zone is also known by what term?
 A) Gretel Zone B) Riding Hood Zone C) Goldilocks Zone D) Cinderella Zone

- _____ 40) An object is dropped from rest and falls freely 100 meters to Earth. When is the speed of the object 9.8 meters per second?
- A) after it has fallen 9.8 meters B) when it hits the ground
C) only during the entire first second of its fall D) during its entire time of fall
- _____ 41) Which of these is a layer of the Earth which marks the border of the crust and the mantle, named for a Croatian seismologist?
- A) Tropopause B) Moho C) Blazevich layer D) Lehmann Discontinuity
- _____ 42) Which of these is an example of a carnivorous plant?
- A) Begonia B) Hydrangea C) Marigold D) Sundew
- _____ 43) The oviduct is another name for which part of the female reproductive system?
- A) cervix B) uterus C) fallopian tube D) endometrium
- _____ 44) Which of these planets is considered to be a gas giant?
- A) Mercury B) Earth C) Mars D) Saturn
- _____ 45) SARS, MERS and the Wuhan virus are all classified as what type of virus?
- A) Coronavirus B) Retrovirus C) Parvovirus D) Poxvirus
- _____ 46) Which of these animals is an extinct marsupial, and is sometimes called the Tasmanian Tiger?
- A) Golden Bandicoot B) Echidna C) Thylacine D) Dire Wolf
- _____ 47) Which substance cannot be decomposed by chemical means?
- A) C B) CO C) CO₂ D) C₂H₄O₂
- _____ 48) Which nuclear emission has the least penetrating power and the greatest ionizing ability?
- A) alpha particle B) beta particle c) gamma ray d) positron
- _____ 49) The strongest earthquake in the history of the United States had its epicenter located approximately 75 miles east of which city in 1964?
- A) Honolulu B) San Francisco C) Seattle D) Anchorage
- _____ 50) Each row of beads on an abacus stands for a different power of what number?
- A) 100 B) 1 C) 5 D) 10